



**United States
Department of
Agriculture**

**Agricultural
Marketing
Service**

**Dairy
Programs**

United States Standards for Grades of Dry Whole Milk

Effective April 13, 2001

United States Standards for Dry Whole Milk¹

Definitions

§ 58.2701 *Dry whole milk.*

“Dry whole milk” made by the Spray process or Roller process is the product obtained by removal of water only from pasteurized milk which may have been homogenized. It contains not more than 5 percent by weight of moisture on a milk solids not fat basis and not less than 26 percent but less than 40 percent by weight of milk fat. It shall conform to the applicable provisions of 21 CFR 131 “Milk and Cream” as issued by the Food and Drug Administration. Alternatively, dry whole milk may be obtained by blending fluid, condensed, or dried nonfat milk with liquid or dried cream or with fluid, condensed, or dried milk, as appropriate, provided the resulting dry whole milk is equivalent in composition to that obtained by drying. It contains the lactose, milk proteins, milkfat, and milk minerals in the same relative proportions as the milk from which it was made. It may be optionally fortified with either Vitamins A or D or both.

§ 58.2702 *Milk.*

The term “Milk”, when used in this part, means the lacteal secretion, practically free from colostrum, obtained by the complete milking of one or more healthy cows, and pasteurized at a temperature of 161⁰ F. for 15 seconds or its equivalent in bacterial destruction before or during the manufacture of dry whole milk.

U.S. Grades

§ 58.2703 *Nomenclature of U.S. grades.*

The nomenclature of U.S. grades is as follows:

- (a) U.S. Extra Grade.
- (b) U.S. Standard Grade.

¹Compliance with these standards does not excuse failure to comply with the provisions of the Federal Food, Drug, and Cosmetic Act.

§ 58.2704 *Basis for determination of U.S. grades.*

The U.S. grades of dry whole milk are determined on the basis of flavor, physical appearance, bacterial estimate, coliform count, milkfat content, moisture content, scorched particle content, solubility index and titratable acidity.

§ 58.2705 *Specifications for U.S. grades.*

(a) *U.S. Extra Grade.* U.S. Extra Grade dry whole milk shall conform to the following requirements:

(1) *Flavor.* Reconstituted dry whole milk shall possess a sweet, pleasing and desirable flavor, free from undesirable flavors, but may possess a slight feed flavor and a definite cooked flavor. See Table I. Classification of Flavor of this section.

(2) *Physical Appearance.* Dry whole milk shall possess a uniform white to light cream color. It shall be free from lumps, except those that readily break up with slight pressure, and be practically free from visible dark particles. The reconstituted product shall be free from graininess. See Table II. Classification of Physical Appearance of this section.

(3) *Bacterial estimate.* Not more than 10,000 per gram standard plate count. See Table III. Classification According to Laboratory Analysis of this section.

(4) *Coliform count.* Not more than 10 per gram. See Table III. Classification According to Laboratory Analysis of this section.

(5) *Milkfat content.* Not less than 26.0%, but less than 40.0%. See Table III. Classification According to Laboratory Analysis of this section.

(6) *Moisture content.* Not more than 4.5% (as determined by weight of moisture on a milk solids not fat basis). See Table III. Classification According to Laboratory Analysis of this section. The actual moisture will be calculated and the information will be included on the grading certificate.

(7) *Scorched particle content.* Not more than 15.0 mg. for spray process, and 22.5 mg. for roller process. See Table III. Classification According to Laboratory Analysis of this section.

(8) *Solubility Index.* Not more than 1.0 ml. for spray process, and 15.0 ml. for roller process. See Table III. Classification According to Laboratory Analysis of this section.

(9) *Titratable acidity.* Not more than 0.15% (lactic acid). See Table III. Classification According to Laboratory Analysis of this section.

(b) *U.S. Standard Grade.* U.S. Standard Grade dry whole milk shall conform to the following requirements:

(1) *Flavor.* Reconstituted dry whole milk shall possess a sweet and pleasing flavor, but may possess the following flavors to a slight degree: bitter, oxidized, scorched, stale, and storage; and to a definite degree: cooked and feed. See Table I of this section.

(2) *Physical appearance.* Dry whole milk should be white or light cream color, but may possess a slight unnatural color; and shall be free from lumps that break up readily under moderate pressure; and reasonably free from visible dark particles. The reconstituted product shall be reasonably free from graininess. See Table II of this section.

(3) *Bacterial estimate*. Not more than 50,000 per gram standard plate count. See Table III. Classification According to Laboratory Analysis of this section.

(4) *Coliform count*. Not more than 10 per gram. See Table III. Classification According to Laboratory Analysis of this section.

(5) *Milkfat content*. Not less than 26.0% but less than 40.0%. See Table III. Classification According to Laboratory Analysis of this section.

(6) *Moisture content*. Not more than 5.0% (as determined by weight of moisture on a milk solids not fat basis). See Table III. Classification According to Laboratory Analysis of this section. The actual moisture will be calculated and the information will be included on the grading certificate.

(7) *Scorched particle content*. Not more than 22.5 mg. for spray process, and 32.5 mg. for roller process. See Table III. Classification According to Laboratory Analysis of this section.

(8) *Solubility Index*. Not more than 1.5 ml. for spray process, and 15.0 ml. for roller process. See Table III. Classification According to Laboratory Analysis of this section.

(9) *Titrateable acidity*. Not more than 0.17% (lactic acid). See Table III. Classification According to Laboratory Analysis of this section.

Table I.--Classification of Flavor

Flavor characteristics	U.S. Extra Grade	U.S. Standard Grade
Cooked	Definite	Definite
Feed	Slight	Definite
Bitter	--	Slight
Oxidized	--	Slight
Scorched	--	Slight
Stale	--	Slight
Storage	--	Slight

Table II.--Classification of Physical Appearance

Physical appearance characteristics	U.S. Extra Grade	U.S. Standard Grade
Dry product:		
Unnatural color	None	Slight
Lumps	Slight pressure	Moderate pressure
Visible dark particles	Practically free	Reasonably free
Reconstituted product:		
Grainy	Free	Reasonably free

Table III.--Classification According to Laboratory Analysis

Laboratory tests	U.S. Extra Grade	U.S. Standard Grade
Bacterial estimate; SPC/gram (max)	10,000	50,000
Coliform count; per gram (max)	10	10
Milkfat content; percent	Not less than 26.0, but less than 40.0	Not less than 26.0, but less than 40.0
Moisture content; percent ² (max)	4.5	5.0
Scorched particle content; mg.; (max)		
Spray Process	15.0	22.5
Roller Process	22.5	32.5
Solubility index ml.; (max)		
Spray Process	1.0	1.5
Roller Process	15.0	15.0
Titrateable acidity (lactic acid); percent (max)	Not more than 0.15	Not more than 0.17

²Milk solids not fat basis

§ 58.2707 *Optional tests.*

There are certain optional requirements in addition to those required for U.S. grade assignment. Tests for these requirements may be done occasionally at the option of the Department and will be done whenever they are requested by an interested party. These optional requirements are as follows:

(a) *Vitamin addition.* When either or both Vitamin A or D is added, they shall be present in such quantity that, when prepared according to label directions, each quart of the reconstituted product shall contain: Vitamin A. Not less than 2.000 I.U. Vitamin D. 400 I.U.

(b) *Oxygen content.* Oxygen content (if gas packed) is not a U.S. grade requirement. Percentage of oxygen will be shown on the grading certificates as follows:

Oxygen Content

Not more than 2% Oxygen, or
Not more than 3% Oxygen, or
Oxygen content _____%.

(c) *Protein content.* Protein content is not a U.S. grade requirement. Percentage of protein will be shown on the grading certificates as follows:

Protein Content

Protein content _____%.

§ 58.2708 *U.S. grades not assignable.*

Dry whole milk shall not be assigned a U.S. grade for one or more of the following reasons:

(a) The dry whole milk fails to meet the requirements for U.S. Standard Grade.

(b) The dry whole milk has a direct microscopic clump count exceeding 100 million per gram.

(c) The dry whole milk fails to meet the requirements of any optional test when tests have been made.

(d) The dry whole milk produced in a plant found on inspection to be using unsatisfactory manufacturing practices, equipment, or facilities, or to be operating under unsanitary plant conditions.

§ 58.2709 *Test methods.*

All required tests, and optional tests when specified, shall be performed in accordance with:

(a) Scorched particle content and solubility index shall be determined by the methods contained in the latest revision of 918-RL, Laboratory Methods and Procedures, USDA/AMS/Dairy Programs, Dairy Grading Branch, Room 2746-S, 14th and Independence Ave. S.W. Washington, DC 20250-0230.

(b) All other tests shall be performed by the methods contained in the latest edition of the “Official Methods of Analysis of the Association of Official Analytical Chemists”, published by the Association of Official Analytical Chemists International, 481 North Frederick Avenue, Suite 500, Gaithersburg, MD 20877-2417; by the methods provided in the latest edition of the “Standard Methods for the Examination of Dairy Products”, available from the American Public Health Association, 1015 Fifteenth Street NW, Washington, DC 20005, or by methods published by the International Dairy Federation, available from the International Dairy Federation, 41 Square Vergate, B-1030 Brussels, Belgium.

Explanation of Terms

§ 58.2710 *Explanation of terms.*

(a) *With respect to flavor:*

(1) *Slight.* Detectable only upon critical examination.

(2) *Definite.* Not intense but detectable.

(3) *Undesirable.* Those flavors in excess of the intensity permitted or those not otherwise listed.

(4) *Bitter.* Distasteful, similar to taste of quinine.

(5) *Cooked.* Similar to a custard flavor and imparts a smooth aftertaste.

(6) *Feed.* Feed flavors (such as alfalfa, sweet-clover, silage, or similar feed) in milk carried through into the dry whole milk.

(7) *Oxidized.* A flavor resembling cardboard and sometimes referred to as “cappy” or “tallowy”.

(8) *Scorched.* A more intensified flavor than “cooked” and imparts a burnt aftertaste.

(9) *Stale, Storage.* Lacking in freshness and imparting a “rough” or “harsh” aftertaste.

(10) *Sweet.* The lack of detectable acidity.

(b) *With respect to physical appearance:*

(1) *Practically free.* Present only upon very critical examination.

(2) *Reasonably free.* Present only upon critical examination.

(3) *Slight pressure.* Only sufficient pressure to readily disintegrate the lumps.

(4) *Moderate pressure.* Only sufficient pressure to disintegrate the lumps easily.

(5) *Grainy*. Minute particles of undissolved powder appearing in a thin film on the surface of a glass or tumbler.

(6) *Lumps*. Loss of powdery consistency but not caked into hard chunks.

(7) *Uniform color*. Free from variations in shades or intensity of color.

(8) *Unnatural color*. A color that is more intense than light cream and/or is brownish, dull or grey-like.

(9) *Visible dark particles*. The presence of scorched or discolored specks readily visible to the eye.